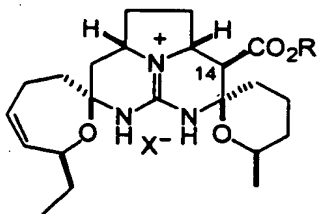


**What is Claimed:**

1. A compound of the formula:

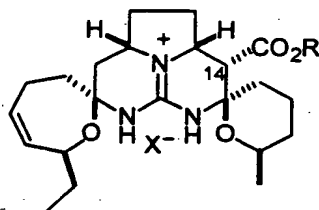


Wherein,

R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

X= any pharmaceutically acceptable counterion.

2. A compound of the formula:

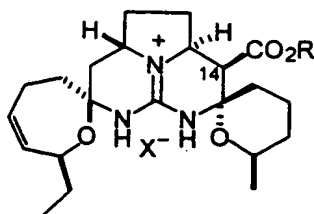


Wherein,

R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

X= any pharmaceutically acceptable counterion.

3. A compound of the formula:



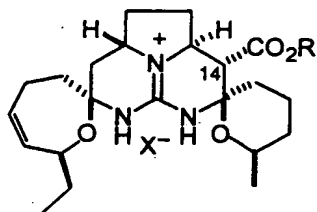
5      Wherein,

R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

X= any pharmaceutically acceptable counterion.

10

4. A compound of the formula:



15

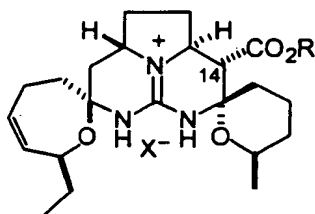
Wherein,

R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

X= any pharmaceutically acceptable counterion.

20

5. A compound of the formula:

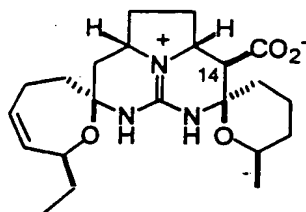


Wherein,

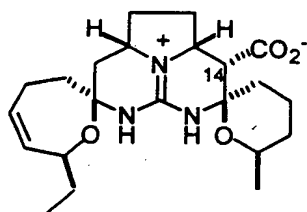
R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

X= any pharmaceutically acceptable counterion.

6. A compound of the formula:

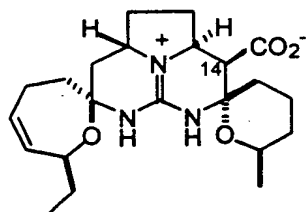


7. A compound of the formula:

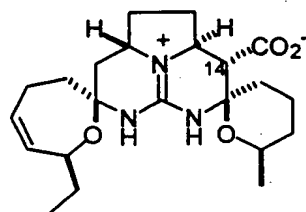


8. A compound of the formula:

5

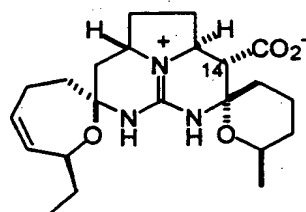


9. A compound of the formula:

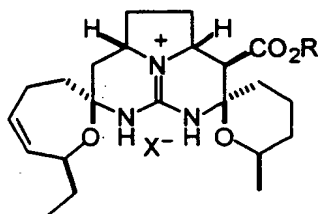


10

10. A compound of the formula:



11. A method for synthesizing a pentacyclic compound of the formula:



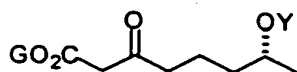
15

Wherein,

R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

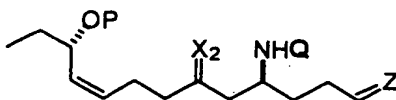
X= any pharmaceutically acceptable counterion

which method comprises reacting a compound of the formula:



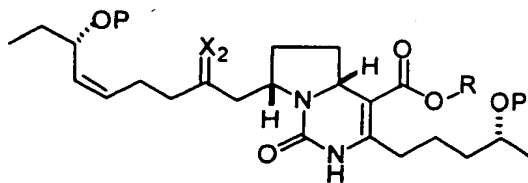
wherein G= a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or  $\omega$ -alkoxycarboxylic acid ester, and  
Y= alcohol protecting group

with a compound of the formula:



wherein  $X_2$ = O or ketone protecting group  
Z= alkene or carbonyl protecting group  
P= alcohol protecting group and  
Q= amino carbonyl group

to produce a compound of the formula:



wherein

$X_2 = O$  or ketone protecting group

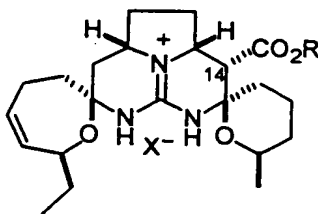
P = alcohol protecting group, and

R = carboxylic acid protecting group,  $\omega$ -alkoxycarboxylic acid  
or  $\omega$ -alkoxycarboxylic acid ester

which compound is subsequently converted to the pentacyclic compound by  
deprotection, incorporation of ammonia, and cyclization.

12. The method of claim 11, wherein when R = a carboxylic acid protecting group, the  
method further comprises the step of deprotecting the pentacycle compound of claim 11.

13. A method for synthesizing a pentacyclic compound of the formula :

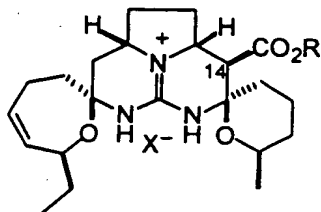


Wherein,

R = H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -  
alkoxycarboxylic acid ester, and

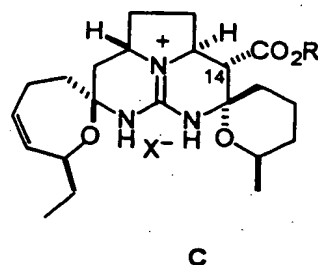
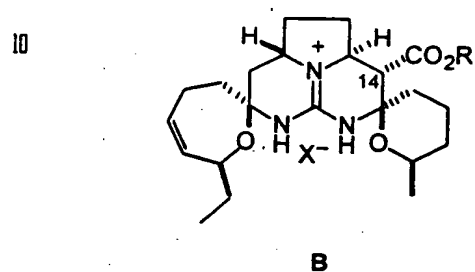
X = any pharmaceutically acceptable counterion,

which comprises epimerizing the stereocenter at carbon-14 of the compound of the  
formula:



14. The method of claim 13, wherein when R= a carboxylic acid protecting group, the  
 5 method further comprises the step of deprotecting the pentacycle compound of claim 13.

15. A method for synthesizing pentacyclic compounds B and C of the formulae:

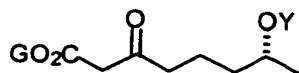


Wherein,

R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -  
 20 alkoxycarboxylic acid ester, and

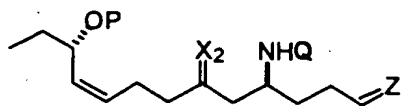
X= any pharmaceutically acceptable counterion,

which comprises reacting a compound of the formula:



25 wherein G= a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or  
 an  $\omega$ -alkoxycarboxylic acid ester, and  
 Y= an alcohol protecting group

with a compound of the formula:



wherein

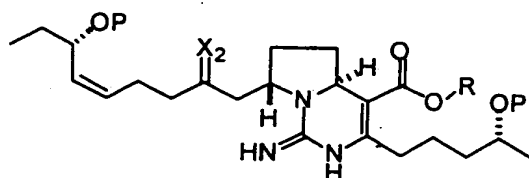
$X_2 = O$  or a ketone protecting group

$Z =$  an alkene or carbonyl protecting group

$P =$  an alcohol protecting group, and

$Q =$  an amidinyl group

To produce a compound of the formula:



wherein

$X_2 = O$  or a ketone protecting group

$P =$  an alcohol protecting group and

$R =$  a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester

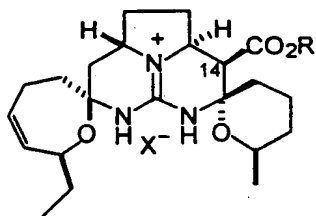
which is subsequently converted to the pentacyclic compound by deprotection and cyclization.

16. The method of claim 15, wherein when  $R =$  a carboxylic acid protecting group, the method further comprises the step of deprotecting the pentacyclic compound B of claim 15.



17. The method of claim 15, wherein when R= a carboxylic acid protecting group, the method further comprises the step of deprotecting the pentacycle compound C of claim 15.

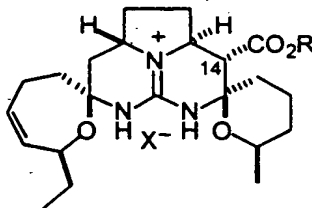
18. A method for synthesizing a pentacyclic compound of the formula:



R= H, a carboxylic acid protecting group, an  $\omega$ -alkoxycarboxylic acid or an  $\omega$ -alkoxycarboxylic acid ester, and

X= any pharmaceutically acceptable counterion.

which comprises epimerizing the stereocenter at carbon-14 and carbon 15 of the compound of the formula:



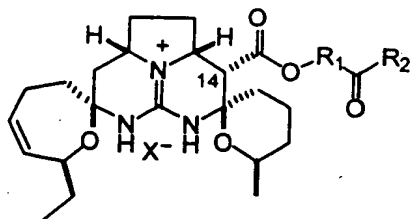
19. The method of claim 18, wherein when R= a carboxylic acid protecting group, the method further comprises the step of deprotecting the pentacycle compound of claim 18.

20. The compound of claim 1, 2, 3, 4, or 5 wherein R= allyl and X= Cl<sup>-</sup>

21. The compound of claim 1, 2, 3, 4, or 5 wherein R=H, and X= Cl<sup>-</sup>.



29. A compound of the formula:



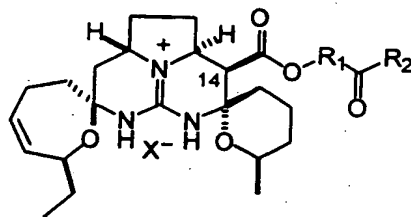
wherein  $R_1$  = any alkyl, aryl or substituted alkyl group

$R_2$  =  $O^-$ , OH,  $OG_1$ , a spermidine moiety or a substituted spermidine moiety

wherein  $G_1$  = a carboxylic acid protecting group and

$X$  = any pharmaceutically acceptable counterion.

30. A compound of the formula:



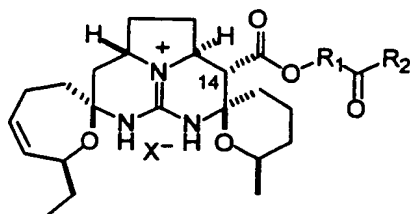
wherein  $R_1$  = any alkyl, aryl or substituted alkyl group

$R_2$  =  $O^-$ , OH,  $OG_1$ , a spermidine moiety or a substituted spermidine moiety

wherein  $G_1$  = a carboxylic acid protecting group and

$X$  = any pharmaceutically acceptable counterion.

31. A compound of the formula:



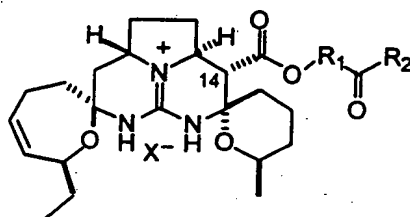
wherein  $R_1$  = any alkyl, aryl or substituted alkyl group

$R_2$  =  $O^-$ , OH,  $OG_1$ , a spermidine moiety or a substituted spermidine moiety

wherein  $G_1$  = carboxylic acid protecting group, and

$X$  = any pharmaceutically acceptable counterion.

32. A compound of the formula:



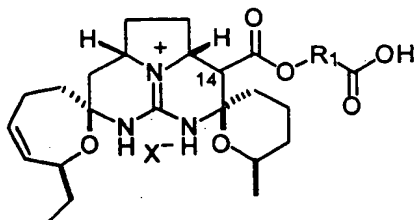
wherein  $R_1$  = any alkyl, aryl or substituted alkyl group

$R_2$  =  $O^-$ , OH,  $OG_1$ , a spermidine moiety or a substituted spermidine moiety

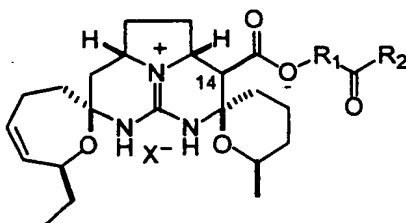
wherein  $G_1$  = carboxylic acid protecting group and

$X$  = any pharmaceutically acceptable counterion.

33. The method of claim 11, wherein when R is an  $\omega$ -alkoxycarboxylic acid, the method further comprises the step of reacting the pentacyclic compound of the formula:

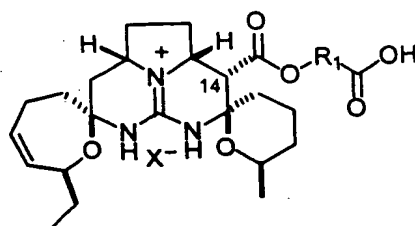


wherein,  $R_1$  = any alkyl, aryl or substituted alkyl group with a protected spermidine or a protected substituted sperimidine and subsequently deprotecting to produce the compound of the formula:

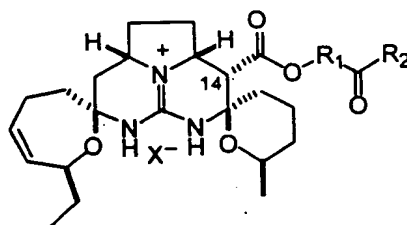


wherein  $R_1$  = any alkyl, aryl or substituted alkyl group  
 $R_2$  = a spermidine moiety or a substituted spermidine moiety and  
 $X$  = any pharmaceutically acceptable counterion.

34. The method of claim 13, wherein when R is an  $\omega$ -alkoxycarboxylic acid the method further comprises the step of reacting the pentacyclic compound of the formula:



with a protected spermidine or a protected substituted sperimidine and subsequently deprotecting to produce the compound of the formula:

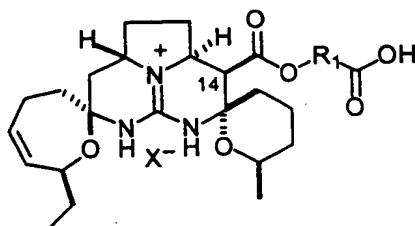


wherein R<sub>1</sub> = any alkyl, aryl or substituted alkyl group

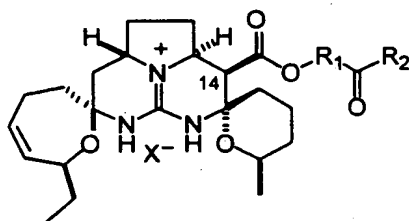
R<sub>2</sub> = a spermidine moiety or a substituted spermidine moiety, and

X = any pharmaceutically acceptable counterion.

35. The method of claim 15, wherein when R is an  $\omega$ -alkoxycarboxylic acid the method further comprises the step of reacting the pentacyclic compound of the formula:

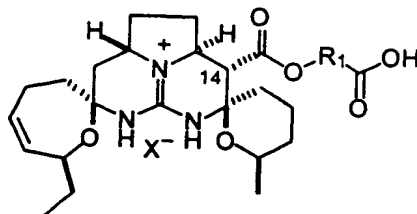


wherein,  $R_1$  = any alkyl, aryl or substituted alkyl group  
 with a protected spermidine or a protected substituted spermidine and subsequently  
 deprotecting to produce the compound of the formula:



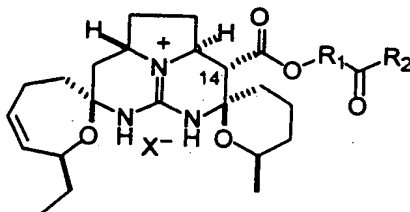
wherein  $R_1$  = any alkyl, aryl or substituted alkyl group  
 $R_2$  = a spermidine moiety or a substituted spermidine moiety and  
 $X$  = any pharmaceutically acceptable counterion.

36. The method of claim 15, wherein when R is an  $\omega$ -alkoxycarboxylic acid the method further comprises the step of reacting the pentacyclic compound of the formula:



5

wherein,  $R_1$  = any alkyl, aryl or substituted alkyl group  
with a protected spermidine or a protected substituted sperimidine and subsequently  
deprotecting to produce the compound of the formula:

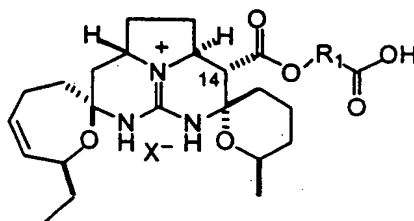


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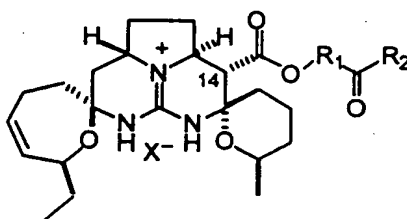
wherein  $R_1$  = any alkyl, aryl or substituted alkyl group  
 $R_2$  = a spermidine moiety or a substituted spermidine moiety and  
 $X$  = any pharmaceutically acceptable counterion.



37. The method of claim 18, wherein when R is an  $\omega$ -alkoxycarboxylic acid the method further comprises the step of reacting the pentacyclic compound of the formula:

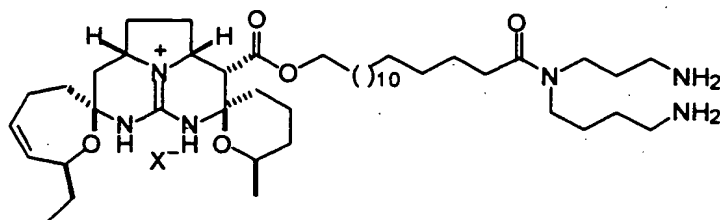


5 wherein,  $R_1$  = any alkyl, aryl or substituted alkyl group  
with a protected spermidine or a protected substituted sperimidine and subsequently  
deprotecting to produce the compound of the formula:



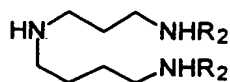
10 wherein  $R_1$  = any alkyl, aryl or substituted alkyl group  
 $R_2$  = a spermidine moiety or a substituted spermidine moiety and  
 $X$  = any pharmaceutically acceptable counterion.

38. A method for synthesizing Ptilomycalin of the formula:

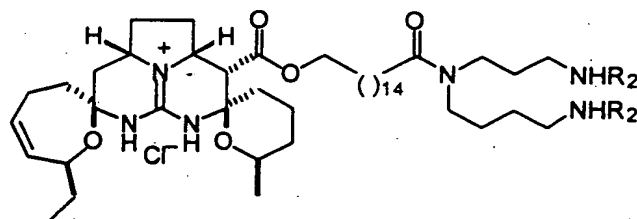


ptilomycalin A

which comprises reacting the pentacyclic compound of claim 22 with the compound  
5 of the formula:

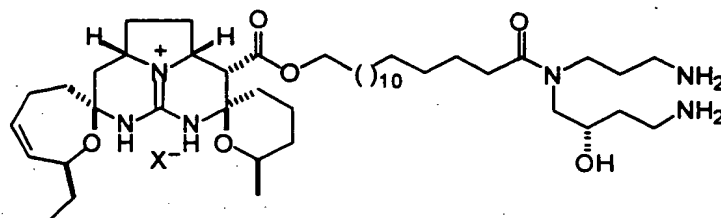


wherein  $R_2$  = an amine protecting group  
to produce a compound of the formula:



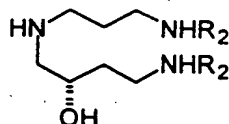
10 which is subsequently deprotected to produce Ptilomycalin A.

39. A method for synthesizing Crambescidin 800 of the formula:



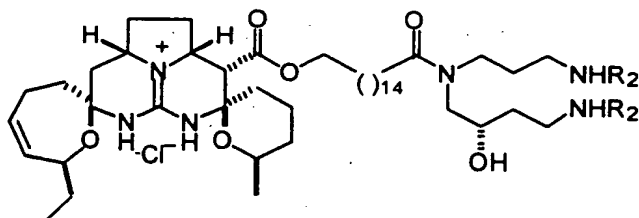
crambescidin 800

which comprises reacting the pentacyclic compound of claim 22 with the compound of the formula:



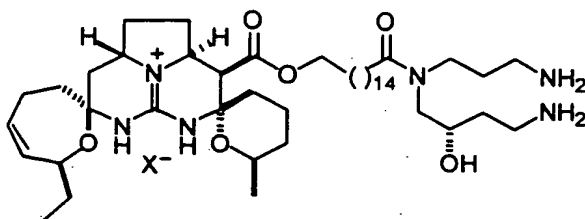
wherein  $R_2$  = an amine protecting group

to produce a compound of the formula:



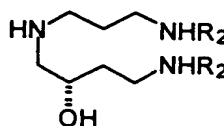
which is subsequently deprotected to produce Crambescidin 800.

40. A method for synthesizing 13, 14, 15-Isocrambescidin 800 of the formula:



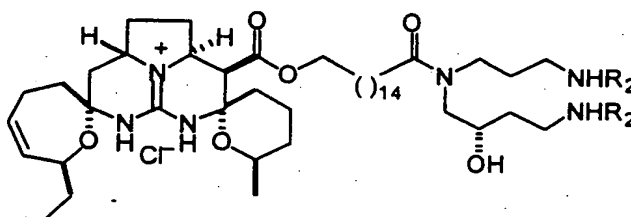
13, 14, 15-isocrambescidin 800

which comprises reacting the pentacyclic compound of claim 24 with the compound of the formula:



wherein  $R_2$  = an amine protecting group

to produce a compound of the formula:



which is subsequently deprotected to produce 13, 14, 15-Isocrambescidin 800.

41. An antitumor composition comprising a compound of claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 in admixture with a pharmaceutically acceptable carrier.

42. An antiviral composition comprising a compound of claim 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 in admixture with a pharmaceutically acceptable carrier.

43. An antifungal composition comprising a compound of claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 in admixture with a pharmaceutically acceptable carrier.
44. A method for treating tumors comprising administering to a subject in need of said treatment, an effective amount of compound of claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.
45. A method for treating viral infections comprising administering to a subject in need of said treatment, an effective amount of compound of claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.
46. A method for treating fungal infections comprising administering to a subject in need of said treatment, an effective amount of compound of claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10.